REPORT NO. NADC-73209-30

QUALIFICATION TESTING OF MICROCOM CORPORATION BEACON TRANSMITTER TYPE XB-12

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18 January 1974

FINAL REPORT
AIRTASK NO. A5355352/001D/4W47330100

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Prepared for
NAVAL AIR SYSTEMS COMMAND
Department of the Navy
Washington, D. C. 20360

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER NADC-73209-30	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE *(and Subtitle)* QUALIFICATION TESTING OF MICROCOM CORPORATION BEACON TRANSMITTER TYPE XB-12		5. TYPE OF REPORT & PERIOD COVERED Final Report 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) J. Ozer		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Air Vehicle Technology Department (Code 30) Naval Air Development Center Warminster, Pa. 18974		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS AIRTASK A5355352/001D/ 4W47330100
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Air Systems Command Department of the Navy Washington, D.C. 20360		12. REPORT DATE 18 January 1974 13. NUMBER OF PAGES 8
14. MONITORING AGENCY NAME & ADDRESS*(if different from Controlling Office)*		15. SECURITY CLASS. *(of this report)* Unclassified 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT *(of this Report)*

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17. DISTRIBUTION STATEMENT *(of the abstract entered in Block 20, if different from Report)*

18. SUPPLEMENTARY NOTES

19. KEY WORDS *(Continue on reverse side if necessary and identify by block number)*

Aerial Targets

20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report covers the qualification tests of a radio frequency beacon intended for use in identifying and/or locating a recoverable aerial target. Failures experienced in testing to specifications are reported. Subsequent correction of deficiencies and retesting produced satisfactory results. This Beacon is considered qualified for service use.

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SUMMARY

This report covers the qualification tests of a radio frequency beacon intended for use in identifying and/or locating a recoverable aerial target. Failures experienced in testing to specifications are reported. Subsequent correction of deficiencies and retesting produced satisfactory results. This Beacon is considered qualified for service use.

INTRODUCTION

Six Beacon Transmitters were procured from the Microcom Corporation and tested for compliance with the requirements of reference (a).

Test equipment and test setup are shown in Table I and figure 1, respectively.

TESTS

EXAMINATION OF PRODUCT

Investigation of the physical characteristics of the beacon showed the item to be well designed. Thick film, state-of-the-art, construction techniques were used to excellent advantage. The unit is a compact, rugged transmitter, with overall dimensions and weight within the limits of reference (a).

OPERATIONAL AND INTERFERENCE

Prior to acceptance of the six beacons, operational and interference testing was performed and witnessed at the manufacturer's plant. The tests performed were: Primary Power, Frequency, Impedance, Output Power, Modulation, Spurious Emissions and Modulation Distortion.

ENVIRONMENTAL

Testing to environmental and combinations of environmental extremes was performed at NAVAIRDEVCEN (Naval Air Development Center). The following tests were performed: Vibration, Shock, Acceleration, Temperature, Altitude, Humidity, Leakage (Immersion), Combination of Temperature and Altitude, and Combination of Temperature and Immersion. Tests limits are contained in reference (a).

RESULTS

One failure occurred during Shock test. An internal crystal lead severed and the unit stopped transmitting. A new crystal was installed and the beacon operated satisfactorily but at a slightly reduced power output. There are no tuning adjustments except when the thick film circuit is manufactured. The unit had exhibited an output power of 1.0 watt prior to failure. Therefore it was considered to have demonstrated that capability and the test was continued to verify other parameters.

Two failures during Immersion tests resulted when water leaked past the R.F.I. sealed case covers causing internal short circuits.

After drying and testing, the transmitter operated satisfactorily.

Redesign of the transmitter cover seals corrected this problem as borne out by subsequent immersion tests.

All subsequent tests proved satisfactory.

A nominal 1.0 watt of R.F. output power and stable output frequency was indicated for all tests.

Sample data is given in Tables II, III and IV.

C O N C L U S I O N S

The overall size, operation and unique construction make this unit an excellent transmitter for its intended use. Correction of experienced deficiencies, during the course of these tests, qualifies this item for procurement.

TABLE I

Test Equipment

Power Supply (500 ma. capability)	HP-6205B
Power Meter	HP-431C
20 dB Attenuator	HP-8491A
Adjustable Attenuator	Gen. Rad. 874 GA
Receiver, VHF (AM)	Astro. Comm. Lab. TR-104A and Type TH-100P
Spectrum Analyzer	HP-140S
Distortion Analyzer	HP-331A

TABLE II

XB-12 Beacon Transmitter
Serial #1

TEMP (°C)	INPUT CURRENT (AMPS)	* RF POWER OUT (WATTS)	MODULATION FREQ (Hz)	% MODULATION	MODULATION DISTORTION (%)	OUTPUT FREQ (K Hz)	OUTPUT FREQ HARMONIES (db)
80	0.280	0.65	998	32	5.3	235012.78	-53
60	0.300	0.70	1004	35	4.25	235010.13	-52
40	0.315	0.74	1012	37	3.9	235009.75	-52
25	0.320	0.76	1017	37	3.7	235010.1	-52
20	0.320	0.77	1019	36	3.8	235010.05	-52
0	0.325	0.79	1029	35	3.9	235010.47	-51
-20	0.320	0.80	1042	32	3.75	235010.86	-51
-30	0.320	0.795	1047	32	3.9	235010.60	-51
-40	0.325	0.79	----			235009.76	

* This transmitter had experienced the crystal failure described in the report. Prior to failure of the crystal, the output power was 1.0 watt.

TABLE III

XB-12 Beacon Transmitter
Serial #5

TEMP (°C)	INPUT CURRENT (AMPS)	RF POWER OUT (WATTS)	MODULATION FREQ (Hz)	% MODULATION	MODULATION DISTORTION (%)	OUTPUT FREQ (K Hz)	OUTPUT FREQ HARMONIES (db)
80	0.320	1.33	997			235000.8	-51
60	0.275	1.07	980	32	9.5	235003.7	-51
40	0.295	1.12	985	35.6	7.1	235001.6	-51
25	0.315	1.19	992	35.6	4.9	235001.2	-51
20	0.320	1.27	996	35.6	4.1	235001.4	-51
0	0.330	1.32	1006	35.6	3.5	234999.9	-51
-20	0.330	1.35	1014	32	3.5	234999.1	-51
-30	0.325	1.35	1022	32	3.5	234995.9	-51
-40	0.320	1.35	1027	30	3.6	234995.2	-51

TABLE IV

XB-12 Beacon Transmitter
Serial #2

TEMP (°C)	INPUT CURRENT (AMPS)	RF POWER OUT (WATTS)	MODULATION FREQ (Hz)	% MODULATION	MODULATION DISTORTION (%)	OUTPUT FREQ (K Hz)	OUTPUT FREQ HARMONIES (db)
80	0.330	1.0	1005	41.5	3.3	235001.6	-53
60	0.305	0.98	991	41.6	4.8	235003.3	-54
40	0.320	1.02	998	41.6	5.4	235001.5	-53
25	0.330	1.02	1006	41.6	4.6	235000.5	-53
20	0.340	1.02	1017	40.5	4.5	235000.2	-53
0	0.350	1.02	1032	40.5	4.4	234999.7	-53
-20	0.340	1.02	1045	40.5	4.8	234998.1	-53
-30	0.330	1.02	1055	36.8	4.7	234996.1	-52
-40	0.320	1.02	----	----	---	234993.1	

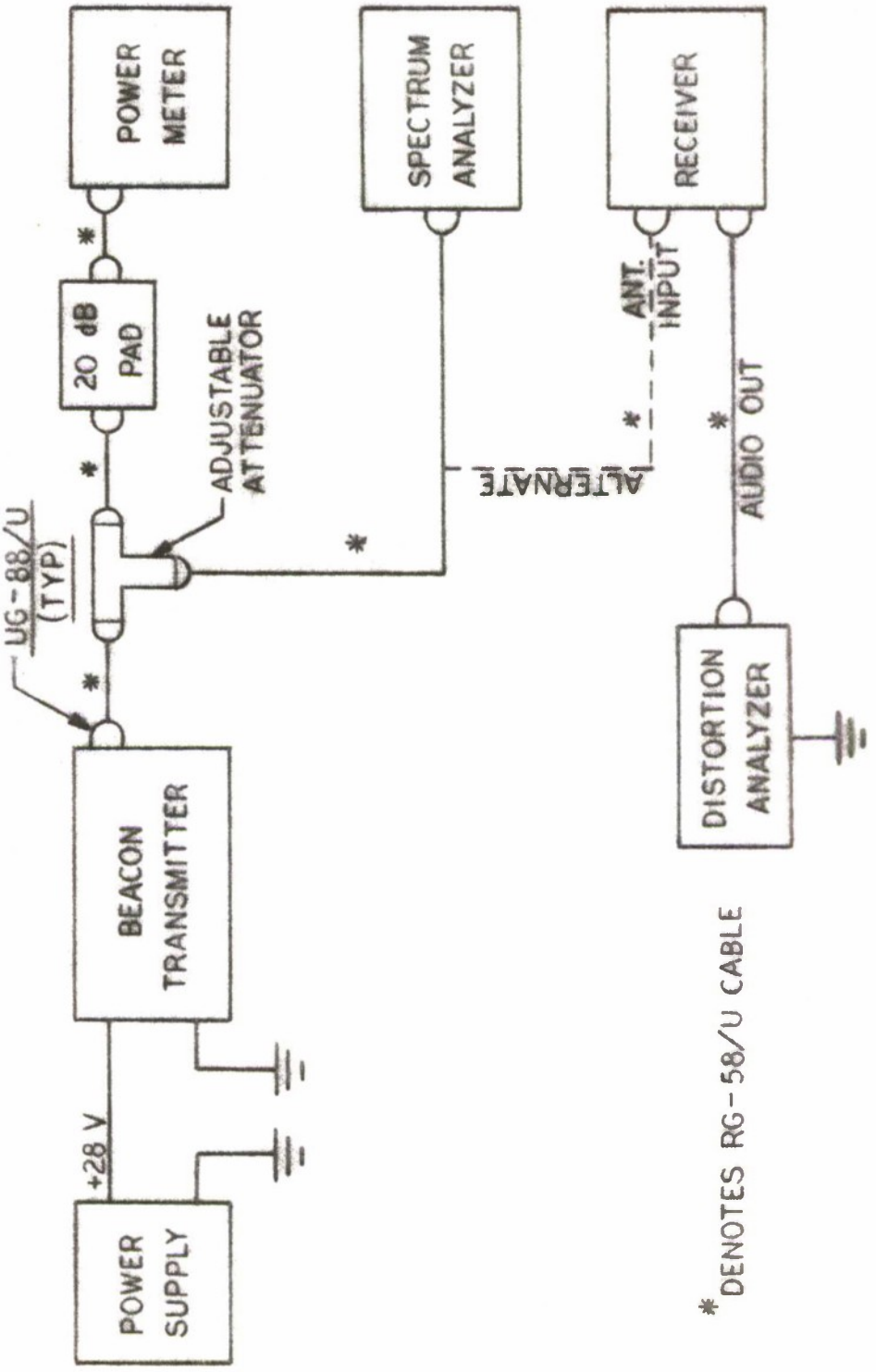

FIGURE 1 TEST SET UP

VI. REFERENCE

(a) E. F. Bracht, Proposed Military Specification for Radio Frequency Beacon AN/ART (*), Naval Air Development Center, Report No. NADC-72248-VT, 9 January 1973